

# Air Toxic Risk Communication

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# Air Toxic Projects

- ◆ Over 200 monitors currently operating in Ohio
- ◆ Monitoring focused on Division's Program Goals
  - Compliance with Ambient Air Quality Standards
  - Real-Time monitoring for air pollution episodes
  - Data for Trend Analysis
  - Urban Air Toxic Studies
  - Complaint Investigation
  - Data for Risk Assessment/ Risk Management
  - Superfund/Indoor Air

# Air Toxic Projects

- ◆ Heavy Metals
  - Example: arsenic, cadmium, chromium
- ◆ Volatile Organic Compounds ( VOCs)
  - Example: benzene, carbon tetrachloride, toluene
- ◆ Semi-Volatile Organic Compounds (SVOCs)
  - Example: PCBs, dioxins, Polycyclic Aromatic Hydrocarbons (PAHs)

# State of Ohio Perspective Risk Assessment

- Risk assessments are essential to examine and explain local and state risks
  - Ability to compare to other local, state, national, and international measurements or predictions
  - Used to gauge compliance with U.S. EPA programs
  - Enforcement/public health risk

# Air Exposure Assumptions

- Assumes people breath outdoor air everyday, all day
  - Does not provide detailed exposure information for more accurate assessment

# Screening Analysis

- Detected compounds are screened (compared) against a risk-based standard
  - The standard is based on the proposed level of acceptable risk
- **Cancer compounds-**  
U.S. EPA Unit Risk Factors (URF)
- **Non-Cancer Compounds-**  
U.S. EPA Reference Concentrations (RfC)

# Air Exposure Assumptions

- Total risk from all measured compounds assessed from several years of air monitoring data
- Calculated for worse case scenario
- Calculated for maximum possible exposure scenario
- Designed to evaluate “maximum risk”; actual risk level is lower

# Risk Range

<b>No Action Necessary</b>	<b>Ample Margin of Safety</b> consideration of technical feasibility and other factors (e.g. background and national exposure levels)	<b>Action Level</b> risk further evaluated weighing other factors (e.g., likelihood of exposure, duration of exposure etc)
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(1 in 1,000,000) $10^{-6}$

(1 in 10,000) $10^{-4}$

← **RISK LEVEL** →

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# Air Toxic Risk VOCs

- Risk for chemicals without IRIS toxicity values
  - General Hierarchy
  - NECA Proposed
  - Literature Studies
  - Route to Route Extrapolation

# Health Assessment

- ◆ Purposeful differences between a health assessment and a risk assessment
  - U.S. EPA risk assessment is the characterization of the probability of adverse effects from human exposures to environmental hazards
  - Health assessment is focused on qualitative, site specific, medical public health perspective
    - Exposures are discussed in terms of sensitive populations, mechanics of toxic chemical action, and possible disease outcomes

# Health Assessment

- ◆ In this context, “traditional” risk assessments differ from health assessments in that they are quantitative, chemical oriented characterizations that use statistical and biological models to calculate numerical estimates of risk to health

# Air Toxic Monitoring Results

## Arsenic

IRIS Screening Value =  $2 \text{ E-4 } \mu\text{g}/\text{m}^3$  to  $2\text{E-2 } \mu\text{g}/\text{m}^3$

County	$\mu\text{g}/\text{m}^3$			
	2000	2001	2002	2003
1	0.00165	0.00164	0.00110	0.00150
2	0.00099	0.00154	0.00208	NA
3	0.00177	0.00149	0.00136	0.00147
4	0.00172	0.00156	0.00146	0.00133
5	0.00190	0.00178	0.00171	0.00147
6	0.00200	0.00146	0.00128	0.00127
7	0.00155	0.00219	0.00166	0.00380
8	0.00134	0.00155	0.00122	0.00106
9	0.00136	0.00156	0.00129	0.00103
10	0.00146	0.00124	0.00096	NA
11	0.00146	0.00120	0.00095	NA
12	0.00134	0.00130	0.00129	0.00083



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# Air Toxic Monitoring Results

## Total Chromium

IRIS Screen Value  $8\text{E-}3 \mu\text{g}/\text{m}^3$  to  $8\text{E-}5 \mu\text{g}/\text{m}^3$  (Cr IV)

Location	2000	2001	2002	2003
1	0.00165	0.00451	0.00453	0.00370
2	0.00099	0.00422	0.00492	NA
3	0.00635	0.00552	0.00536	0.00203
4	0.00652	0.00562	0.00564	0.00450
5	0.00450	0.00505	0.00544	0.00417
6	0.00405	0.00435	0.00372	0.00363
7	0.00415	0.00430	0.00399	0.00390
8	0.00407	0.00403	0.00412	0.00617
9	0.00414	0.00437	0.00449	0.00653
10	0.00403	0.00530	0.00385	NA
11	0.00388	0.00371	0.00445	0.00340
12	0.01698	0.02350	NA	0.01767

# Air Toxic Monitoring Results

## Manganese

IRIS Screening Value =  $0.05 \mu\text{g}/\text{m}^3$

Location	$\mu\text{g}/\text{m}^3$			
	2000	2001	2002	2003
1	<b>0.06350</b>	<b>0.31642</b>	<b>0.15958</b>	<b>0.15400</b>
2	0.01070	0.01700	0.14360	NA
3	0.16200	0.11358	0.10300	0.09000
4	0.16600	0.11992	0.11067	0.09233
5	0.06800	0.05908	0.07350	0.03400
6	0.06000	0.05258	0.02617	0.03433
7	0.06000	0.05175	0.03092	0.05000
8	0.02900	0.02607	0.01440	0.01467
9	0.02600	0.02548	0.01824	0.01300
10	0.01000	0.00859	0.01068	NA
11	0.03600	0.05110	0.05750	NA
12	0.03600	0.04500	0.04667	NA



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# Air Toxic Risk

## Yes or No

- Ohio EPA
  - Arsenic and Chromium = NO
  - Manganese = Potential, needs investigation
- Other Interpretations = Yes for all chemicals
  - Based on literature studies, proposed values or Screen numbers from other programs regions

# Air Toxic Risk Communication

What are we as Region V States to Do?



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